

Abstract of the Disclosure

**[00192]** The subject invention pertains to nanoscale polyhedron-shaped molecules having molecular building blocks connected at their vertices. The subject invention also concerns methods of producing nanoscale polyhedrons utilizing a self-assembly reaction. The resultant molecules are faceted polyhedra that are porous, chemically robust, contain chemically accessible sites on their facets, and which are neutral and soluble in common laboratory solvents. The nanoscale polyhedrons can exhibit additional desirable physical properties, such as ferromagnetic properties.